**Course Objectives:** While this seminar will cover some technical aspects, the main focus is to increase a student’s understanding of the steps involved in conceptualizing inferential models in a GIS environment. Although many of the concepts of model-building and integrating spatial analysis and GIS discussed here are general enough to be appropriate for other types of inductive modeling applications, we will focus on species distribution models (SDM) as the application area. There is no formal lab component although students are expected to be sufficiently familiar with a GIS software package (ESRI ArcGIS is recommended) in order to perform analysis for their final project as well as for a group modeling exercise. Additional experience with spatial statistics or other statistical analysis is highly recommended. An introductory GIS course is the only prerequisite, although students are expected to be very computer proficient in general.

**Readings:** The main weekly discussion will focus on 2-4 required articles per week that pertain to a specific technical or conceptual aspect of SDM, as well as 1-2 related articles presented by a student. All of the readings (listed in references below) are available on-line. Students should use the list of recommended references associated with each week’s theme to select a paper to present and discuss. Please let me know if you have any trouble getting an electronic version of any of the papers on the required or recommended list.

**Recommended Book:** Franklin, J. (2009) *Mapping Species Distributions: Spatial Inference and Prediction.* It’s not required, but this book is a great introduction to and extensive overview of SDM and would be a really useful complement to the topics we’ll discuss.

**Assessment:** Your grade will be determined based on an article report, group SDM exercise, final project (paper & presentation), and contribution to class discussion.

- **Discussion leader & article summary (20%)**: Students will be responsible for leading discussions 1-2 times per semester. The discussion will be based primarily on an article selected from the list of recommended references and the article should be discussed in the context of that day’s topic. The discussion leader should also submit at the beginning of class a summary of the article and ‘bullet points’ (interesting things, issues) they plan to discuss (can be 1-2 pages typed).
- **SDM exercise (20%)**: Students will work in groups implementing all steps of developing a species distribution model using the same dataset.
- **Weekly summary (15%)**: At the beginning of (almost) each class, students will submit a 1 page ‘mini review’ of the week’s topic based on the articles read. ‘WS’ in the deliverable section below indicates the days these are submitted. On the days that you are discussion leader, you must submit both the weekly summary pertaining to all articles as well as the summary pertaining to the recommended article you are discussing.
- **Final project (40%)**: The final project will allow each student to implement a modeling project using real data within a GIS. The final paper should be written in manuscript format (~20 pages double-spaced; follow *Ecological Modelling* guidelines here: [http://www.elsevier.com/wps/find/journaldescription.cws_home/503306/authorinstructions](http://www.elsevier.com/wps/find/journaldescription.cws_home/503306/authorinstructions)) and will be due by 5 pm on May 8. A rubric will be available on Blackboard.
- **Participation (5%)**: Seminars depend on class discussion--be prepared to read and talk a lot!
**CLASS STRUCTURE:** In order to facilitate the discussion-oriented seminar format, all readings must be read by the assigned date. Obviously in a class that meets only once a week, attendance is very important. Please see me ahead of time if you must miss a class.

**TENTATIVE CLASS SCHEDULE:**

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<tr>
<th>Date</th>
<th>Topic(s)</th>
<th>Required readings</th>
<th>Deliverable/(student discussant)</th>
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<tbody>
<tr>
<td>Jan. 20</td>
<td>Introduction/course overview</td>
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<td>Mar. 17</td>
<td><strong>Spring Break</strong></td>
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<td>Date</td>
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<td>TBA</td>
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<td>Apr. 21</td>
<td>No Class</td>
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<td>Apr. 28</td>
<td>Wrap-up</td>
<td>TBA</td>
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<td>May 5</td>
<td>Student paper presentations</td>
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<td></td>
<td>Final paper due by 5 pm, Friday May 8</td>
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**Miscellaneous Details and Information for GRG396T:**

**Prospectus:** A 1-2 page prospectus that outlines your plan for the final project will be due at the beginning of class on Feb. 24. The prospectus should consist of your research question, data description, and the methods you intend to use, as well as what your intended outcome. I’ll provide additional resources for appropriate data if you don’t have your own.

**Model Software Exercise:** Students will ‘compete’ in groups using the same data and a SDM method. The groups will follow the modeling steps outlined in class (conceptualization, formulation, assessment) and provide me with a GIS map of their product, a species distribution map, on March 9 by 5 pm. Each group will submit a report outlining the steps they took, subjective decisions made, and each individual’s contribution.

**Required References:**


RECOMMENDED REFERENCES FOR STUDENT PRESENTATIONS:
Response data:

Scale/Predictor variables:

Statistical methods:

Assessing outcomes:


**Uncertainty:**


**Spatial autocorrelation:**


**Spatial nonstationarity:**


**Simulated Data:**


**Movement:**


